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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|--------------------------------------|------------------------------------|
| 10/551,598 | 09/30/2005 | Mark W Wanlass | NREL 01-52 | 1452 |
| <div>7590 Paul J. White Nrel 1617 Cole Blvd. Golden, CO 80401</div> | | | <div>EXAMINER MOWLA, GOLAM</div> | |
| | | | <div>ART UNIT 1795</div> | <div>PAPER NUMBER</div> |
| | | | <div>MAIL DATE 12/22/2009</div> | <div>DELIVERY MODE PAPER</div> |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/551,598 | Applicant(s) WANLASS ET AL. | |
| | Examiner GOLAM MOWLA | Art Unit 1795 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-77 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) ____ is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-77 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-49, drawn to a photovoltaic cell.

Group II, claim(s) 50-54, drawn to a photovoltaic cell.

Group III, claim(s) 55-67, drawn to a photovoltaic cell.

Group IV, claim(s) 68-75, drawn to a photovoltaic cell.

Group V, claim(s) 76-77, drawn to a light emitting device.

2. The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the common technical feature is the use of a silicon base layer and a perovskite oxide layer, wherein an intermediate layer of silicon oxide is in between the silicon base layer and the perovskite layer. This element cannot be a special technical feature under PCT rule 13.2 because the element is shown in the prior art. US 5912068 to Jia teaches a solar cell having, for example an overall structure of Si/SiO₂/YSZ/Si, wherein YSZ is yttria-stabilized zirconia, i.e., a perovskite oxide.

3. This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

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- Species A comprising gallium (“Ga”) based compound (see table 4 of pages 18-21 of Specification) (claims 7-9, 17-22, 26-31, 39-41, 49, 53, 58-59, 63-67 and 71-75); and
- Species B comprising germanium (“Ge”) based compound (see table 4 of pages 18-21 of Specification) (claims 9-10, 36-38 and 46-48).

Upon election of species A, Applicant needs to further elect one of the following distinct sub-species:

- Sub-Species A₁ which requires the gallium based compound to comprise Ga, In, As and P (see table 4 of pages 18-21 of Specification) (claim 40); and
- Sub-Species A₂ which requires the gallium based compound to comprise Ga, In, As and Sb (see table 4 of pages 18-21 of Specification) (claim 41).

Applicant is required, in reply to this action, to elect a single species to which the claims shall be restricted if no generic claim is finally held to be allowable. The reply must also identify the claims readable on the elected species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered non-responsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

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4. The claims are deemed to correspond to the species listed above in the following manner:

Species A comprising gallium ("Ga") based compound (claims 7-9, 17-22, 26-31, 39-41, 49, 53, 58-59, 63-67 and 71-75); and Species B comprising germanium ("Ge") based compound (claims 9-10, 36-38 and 46-48). Sub-Species A₁ which requires the gallium based compound to comprise Ga, In, As and P (claim 40); and Sub-Species A₂ which requires the gallium based compound to comprise Ga, In, As and Sb (claim 41).

The following claim(s) are generic: claims 1, 50, 55 and 68.

5. The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons: the common technical feature between the species are a compliant substrate and subcells. This element cannot be a special technical feature under PCT rule 13.2 because the element is shown in the prior art. US 5912068 to Jia teaches such a compliant substrate and subcells (col. 3, line 24 through col. 4, line 2).

6. Due to the complexity of the restriction requirement, a telephone was not made to request oral election to above restriction requirement. See MPEP §812.01.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a species or invention to be examined even though the requirement may be traversed (37 CFR 1.143) and (ii) identification of the claims encompassing the elected invention.

The election of an invention or species may be made with or without traverse. To preserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse.

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571) 270-5268. The examiner can normally be reached on M-F, 0900-1700 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JENNIFER KOLB-MICHENER can be reached on (571) 272-1424 until Dec 31, 2009, or ALEXA NECKEL can be reached on (571) 272-1446 from January 2009, onwards. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 1795
/Jennifer K. Michener/
Supervisory Patent Examiner, Art Unit 1795